

Semi-annual Progress Report

NASA Grant NsG-692

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Title of Project: The Role of d Electrons in Bonding in Metals

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This project has as its goal the observation of the effect of d electrons on the bonding strength of atoms in alloys where the major constituent is a non d electron metal. The technique that is being used is the measurement of the partial pressure of a metal (magnesium) over an alloy containing this metal (magnesium) and a d electron containing metal (scandium).

To date progress is as follows:

1. A system has been prepared that is being used to measure the vapor pressure of metals using the Knudsen effusion technique.
2. Alloys of magnesium containing less than 30% scandium have been prepared by long-term equilibration of liquid magnesium with scandium in sealed tantalum capsules. This equilibration has not been achieved easily and the method of preparing these solid solution alloys needs additional refinement.
3. The vapor pressure of pure magnesium has been measured in the apparatus and good results have been obtained with the data very consistent with data in literature. Measurements have been made of the vapor pressure of some of the alloys but complete data are not available at present and work is continuing in this area.

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